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DIRECTORATE OF
INTELLIGENCE

Industrial Facilities
(Non-Military)

Basic Imagery Interpretation Report

Wang-chu-chuang Nitrogen Fertilizer Plant
Wang-chu-chuang, China

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
Imagery Analysis Service

INSTALLATION OR ACTIVITY NAME			COUNTRY	
Wang-chu-chuang Nitrogen Fertilizer Plant			CH	
UTM COORDINATES	GEOGRAPHIC COORDINATES	[redacted] 25X1	COMIREX NO.	NIETB NO.
50SPR124675	36-45-15N 118-15-30E		None	None
MAP REFERENCE				
548th RTG. USATC, Series 200, Sheet M0381-22HL, 4th ed, Jul 68, Scale 1:200,000				
LATEST IMAGERY USED (SECRET [redacted] 25X1		NEGATION DATE (If required)		
[redacted]		5 October 1969		25X1

ABSTRACT

The primary function of Wang-chu-chuang Nitrogen Fertilizer Plant is the production of urea fertilizer. Aqueous ammonia is a secondary product. Gaseous hydrocarbons from the nearby Wang-chu-chuang Petroleum Refinery provide the feed materials for this production.

Initial construction activity for the plant was observed in December 1969. Construction proceeded rapidly during 1970. Between November 1970 and January 1972 the rate of construction was slower. The plant appeared operational in January 1972, but has not been observed in operation.

This report includes a photograph, a process flow chart, a line drawing of the plant, a discussion of technical features, and a chronological summary of construction and operational status.

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INTRODUCTION

The Wang-chu-chuang Nitrogen Fertilizer Plant is located 10 nautical miles east-southeast of the center of Tzu-po, Shantung Province (see Figure 1). The adjacent Wang-chu-chuang Petroleum Refinery [redacted] is the source of gaseous feedstock and steam. Electric power is received from the regional grid through a nearby transformer substation.

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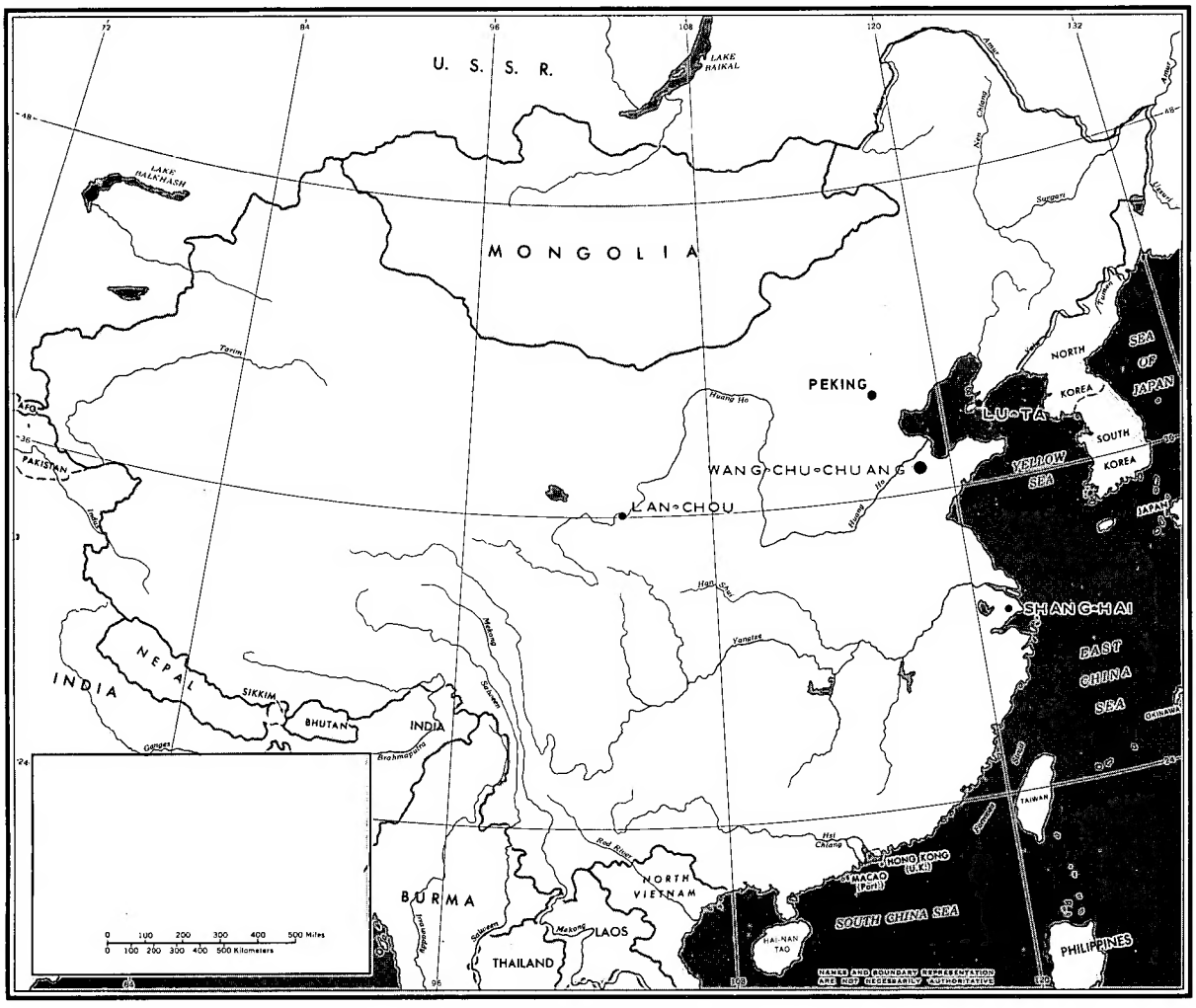

FIGURE 1. LOCATION MAP.

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BASIC DESCRIPTION

The plant occupies 33 acres in a rectangular area measuring approximately 570 by 230 feet overall (see Figures 2 and 3). It is served by road and by a rail spur from the Tzu-po to I-tu rail line.

Operational Functions

The primary function of the plant is the production of prilled urea fertilizer. Aqueous ammonia is a secondary product. The adjacent refinery supplies a gaseous hydrocarbon feedstock which is reformed and purified to provide hydrogen and carbon dioxide for the fertilizer production. The reforming probably occurs in both a primary and a secondary stage. The nitrogen required is derived from ambient air. The oxygen in the air is utilized to oxidize methane and carbon monoxide in the probable secondary reformer, thus leaving the nitrogen gas to be used in the synthesis of ammonia. The process flow for the plant is shown in Figure 4.

The Chinese have continued to expand their nitrogenous fertilizer production capability, with particular emphasis on urea fertilizer. This plant has several aspects that are unique among urea fertilizer plants in China.

Gaseous Feedstock -- Usually the gases used to produce urea are derived from coal. This is the first plant identified in China that uses a gaseous hydrocarbon feedstock from a refinery. This gas is frequently considered a waste material and is burned at a flare tower. Its use probably represents an effort to conserve coal.

Source of Nitrogen -- Nitrogen for urea fertilizer production is usually obtained by using either water gas retorts or an air separation plant to separate the nitrogen from oxygen in the air. Since neither of these facilities has been observed at this plant, it is assumed that a double reforming process is used which utilizes the air as an oxidizer to provide nitrogen.1/ In this process, a primary reformer first takes the gaseous feedstock and breaks it down to methane, hydrogen, carbon monoxide, and carbon dioxide. The gases then pass through a secondary reformer which burns the gas--primarily the methane--in air. This removes the oxygen from the air and the methane from the gas stream leaving nitrogen, hydrogen, carbon dioxide, and carbon monoxide.

Ammonia Synthesis Facilities -- Both the compressor building and the converter tower at this plant are larger than those observed at urea plants previously studied in China. The reason for the larger size is not known; it may indicate that the capability of this plant is larger than that of previously identified plants.

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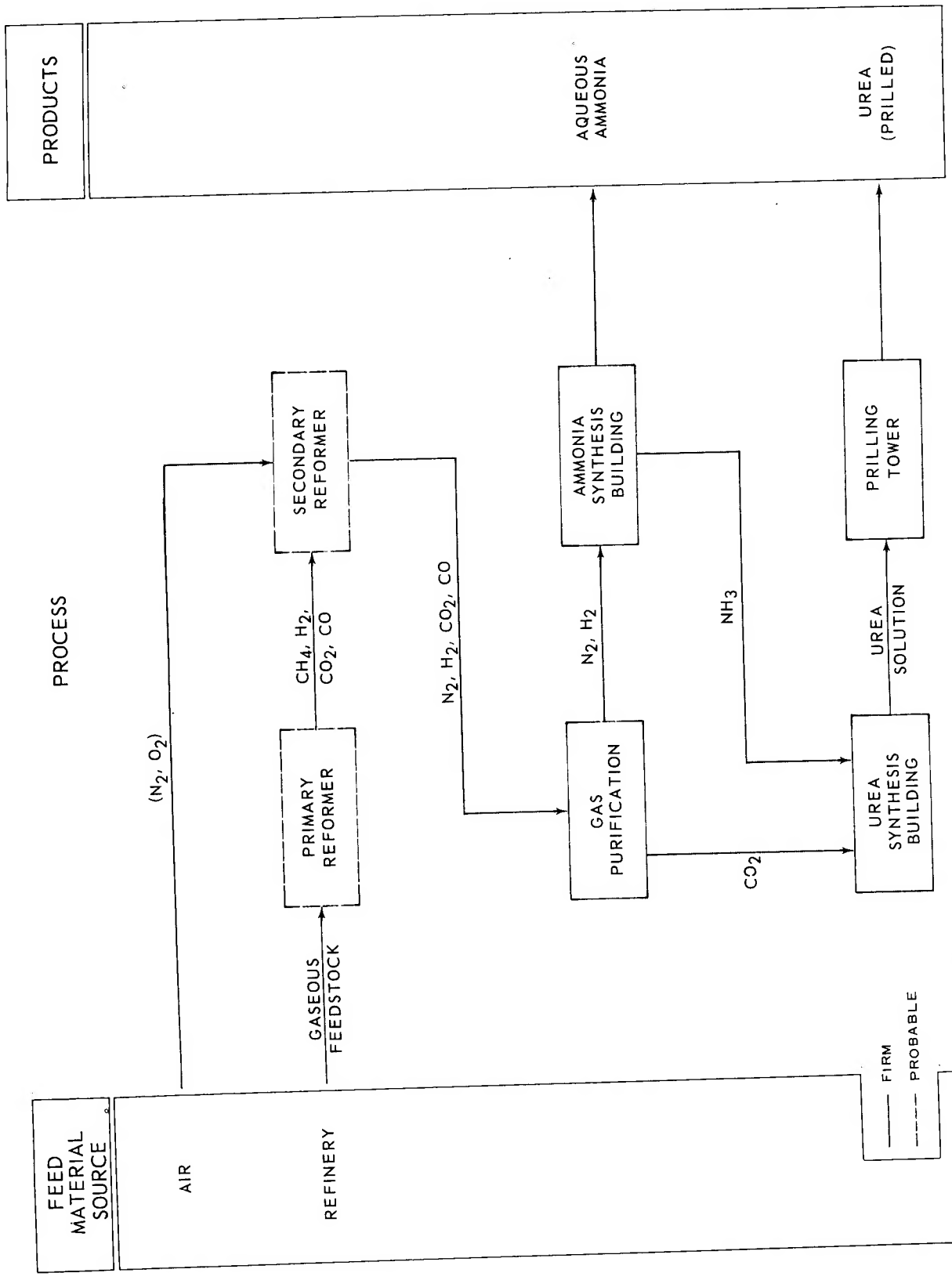

FIGURE 4. PROCESS FLOW AT WANG-CHU-CHUANG NITROGEN FERTILIZER PLANT.

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Circular Warehouse -- The prilled urea warehouse at this plant is circular instead of the usual rectangular shape. This is probably evidence of an improved handling procedure requiring less conveyor equipment. The circular warehouse appears to be a big hopper which is filled from one point at the top and emptied from one point at the bottom.

Construction and Operational Status

Initial construction activity for this plant was observed in December 1969. By November 1970, the ammonia synthesis building, converter tower, prilling tower, and circular warehouse were complete. Since that time the rate of construction has been slower. By April 1971, the urea synthesis building, two buildings in the gas purification area, and the transformer substation were complete. By January 1972, the gas purification facilities were complete and the plant appeared operational.

The plant has not been observed in operation as of January 1972, the date of the latest coverage.

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REFERENCES

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Map

548th RTG. US Air Target Chart, Series 200, Sheet M0381-22HL, 4th edtion, July 1968, Scale 1:200,000 (SECRET/

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Document

Waddams, Austen Lawrence. Chemicals From Petroleum, The Noyes Press, Inc, Pearl River, New York, 1962 (UNCLASSIFIED)

Requirement

COMIREX NO7
Support Number 428914

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